OPERATIONAL MANUAL

Manual No.: DLA-50T-OM1

Issued: January 1994

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DLA-50T SYSTEM

SOLID STATE REFRIGERATOR
BIOMEDICAL, DRUGS AND WHOLE BLOOD

REFRIGERATOR DLA-50T PN A-2244-2

POWER SUPPLY PS-50B PN-A-2160-3

RECORDER DTR-50-10 PN A-2224-2

NSN 4110-01-287-7111
NATO 4310-99-770-7126

THERMOPOL INC.
2468 DELTA LANE ELK GROVE VILLAGE, IL 60007
TELEPHONE: (708) 595-1110

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Section 1

Description and Operation

1-0. Unpacking the DLA-50T

1. Inspect the shipping box immediately for evidence of damage.
2. Stand the carton upright. (Note arrows)
3. Cut the plastic packaging bands.
4. Pull up all top cover's flaps of the shipping box.
5. Pulling from the top, lift the DLA-50T out of the box.
6. Open unit, and remove all inside contents.
7. Verify contents to include:
   - 1 - Power Supply (PS-50B)
   - 2 - Maintenance Manuals (DLA-50T-MM1)
   - 2 - Operation Manuals (DLA-50T-OM1)
   - 1 - Wire Basket (WB-30B)
   - 1 - Power Cable (PC-50B)
   - 1 - Temperature Recorder (DTR-50-10)
8. Inspect contents immediately for damage.

If unit or contents are defective or damaged, contact factory within 24 hours.

Phone (708) 595-1110
FAX (708) 595-3123

or notify in writing to:

Thermopol, Inc.
2468 Delta Lane,
Elk Grove Village, IL 60007.

1-1. System Familiarization

The DLA-50T is a solid state refrigerator/heater unit designed to keep the contents of the load compartment at the blood storage temperature, over the operational ambient range.

The unit has no moving parts, and does not require fans, motors, gas, or air pressure. Cooling is performed by thermoelectric technology.

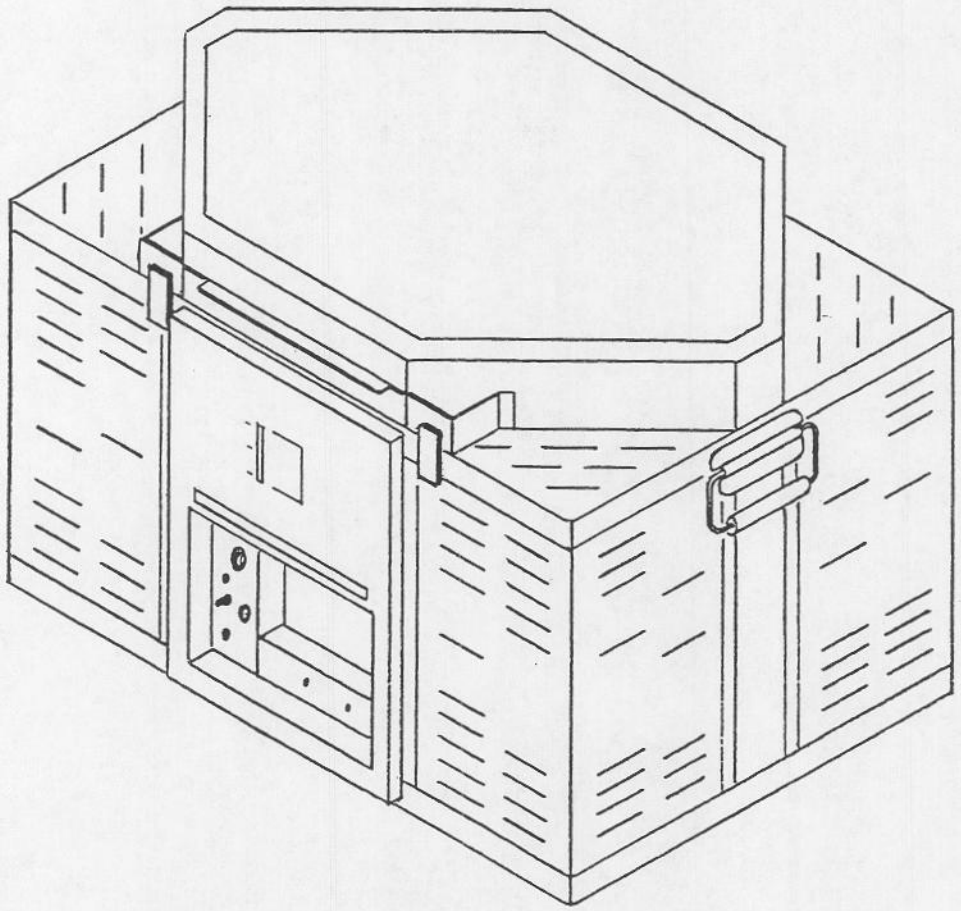

Figure 1
DLA-50T Blood Transportation Refrigerator

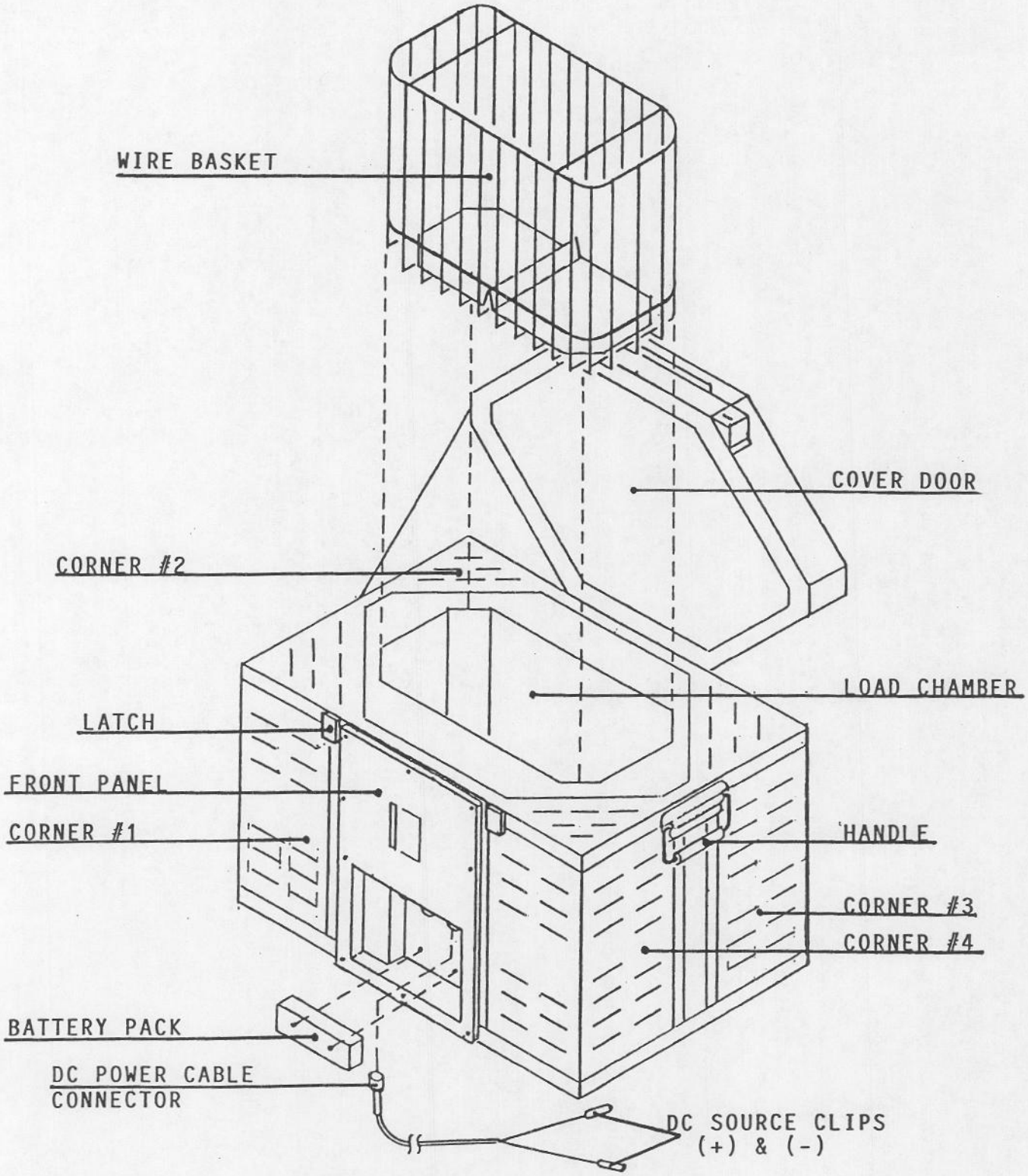

Figure 2
DLA-50T Exploded Front View

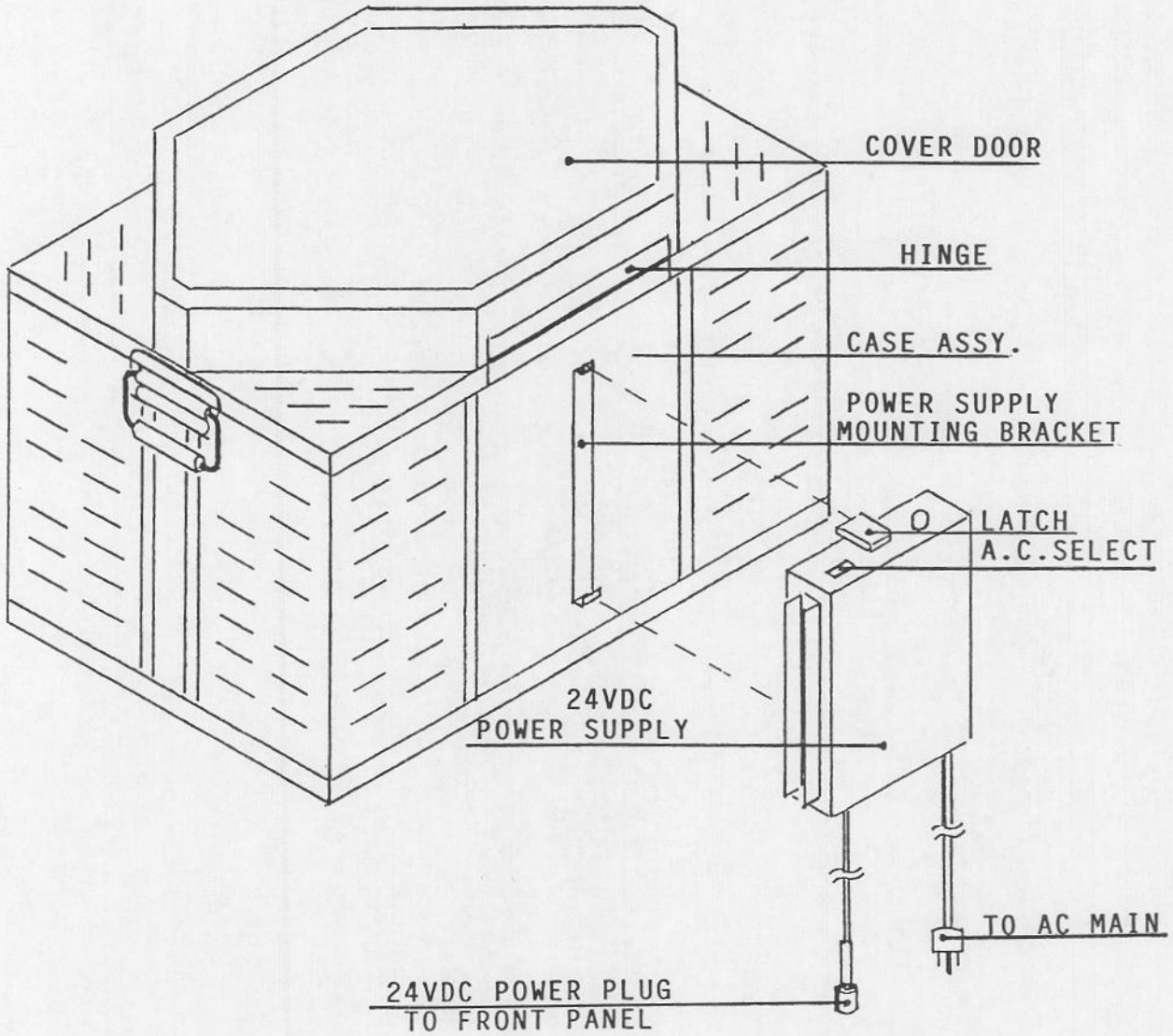

Figure 3
DLA-50T Exploded Rear View

1-2. Description and Specifications

The DLA-50T is a modified commercial blood and vaccine transportation and storage refrigerator specifically modified for operation in military environments.

The DLA-50T operates on 12VDC or 24/28VDC. The unit can also be plugged into a 120VAC or 220VAC main, through a rectifier Power Supply PS-50B. The PS-50B can be mounted on the unit. The DLA-50T inner capacity is approximately 1 cubic foot and can accommodate 37 X 450ml blood bags.

A Brief Function Description:

The DLA-50T System contains several subassemblies, each constructed to achieve easier handling, and improved efficiency. See Pages 6 and 7, Figures 2 and 3.

The CASE ASSEMBLY is constructed of tough, steel sheet metal which will survive even the most rugged environmental conditions. In Place Polyurethane foam insulates the LOAD COMPARTMENT, and allows the DLA-50T to operate between -13°F (-25° C) and 120° F (49°C).

The COVER of the DLA-50T is constructed of high grade Aluminum which reduces the weight of the COVER, and requires minimal effort to operate. Utilizing polyurethane foam, the COVER protects the load, and provides additional insulation to the CASE ASSEMBLY. A Polyurethane double gasket ensures a tight seal, improving efficiency and protecting the load from the environment.

Spring loaded LATCHES securely hold the COVER closed. Riveted in place, the LATCHES are vibration resistant, and are designed to provide years of trouble free operation.

Two carrying handles are supplied with the DLA-50T. These HANDLES are securely riveted in place, and are tested to hold over 4 times the unit's weight. Spring loaded, the HANDLES tuck away neatly when not in use and are rattle free while in transport.

The CONTROL PANEL of the DLA-50T, Page 13 Figure 4, is constructed of high grade Aluminum. The panel contains the "brain power" of the unit. All three systems, Temperature Control, Alarm, and Thermometer systems are housed inside the Control Panel. In addition, the CONTROL PANEL houses the BATTERY PACK (Page 13 Fig.4).

The BATTERY PACK supplies electric current to the ALARM AND THERMOMETER systems. If power failure occurs, the DLA-50T will alarm the operator before the load compartment temperature climbs above 42.8° F (6° C) or drops below 35.6° F (2° C). The DLA-50T Audio-Visual Alarm System and Thermometer, will operate normally with or without the BATTERY PACK while connected to a power source (12 VDC, 24-28VDC or 120VAC, 220VAC via PS-50B Power Supply).

The DLA-50T is supplied with a BASKET to provide easy access for the operator. All 37 blood bags can be loaded or removed from the load compartment in one package. The BASKET is constructed of coated steel wire. It is tested to withstand substantial vibrations, and can be carried, fully loaded.

The DC POWER CABLE is used to connect the DLA-50T to a DC source. The same CABLE can be used to connect the unit to 12VDC or 24/28VDC. The operator must note the markings on the CONTROL PANEL of the DLA-50T to assure proper connection.

Electrical specifications for the DLA-50T are listed below:

DLA-50T Specifications

Voltage	Current
12VDC Nominal	7 Amps Max.
24/28VDC Nominal	4.5 Amps Max.
120VAC, 50Hz	1.6 Amps Max.
120VAC, 60Hz	1.6 Amps Max.
220VAC, 50Hz	0.8 Amps Max.
220VAC, 60Hz	0.8 Amps Max.

Physical Dimensions

	Outside	Inside
Width	26" /66 CM	16.93" / 43 CM
Depth	19-1/4" / 48.9 CM	8.50" / 21.6 CM
Height	18.5" / 47 CM	11.80" / 30 CM
Volume	5.36 CU. FT. / 0.15 CU. Meter	1 CU. FT. / 28 liter

Weight: 68 LBS / 31 KGS

Section 2

Operation

2-1. General

The following information should be used to assist in the prompt set-up of the DLA-50T Blood and Vaccine Refrigerator. These directions for unpacking and installation will considerably ease initial set-up, and avoid unnecessary mistakes.

2-2. Proper Location of Equipment

The DLA-50T is designed to operate at ambient temperatures of between -13° F (-25° C) and 120° F (49° C) as per Climatic Criteria AR 70-38; QSTAG 360.

The unit should be operated or stored in a normally ventilated area that meets AR 70-38; QSTAG 360.

2-3. Assembly Interconnections

The Battery Pack P.N. A-2321 should be mounted directly to the Control Panel. The two slotted screws of the Battery Pack should be securely fastened. When in storage, loosen the two slotted screws to disconnect the Battery Pack. See Page 6 Figure 2.

For AC operation, the PS-50B Rectifier Power Supply P.N. A-2160-3 can be mounted on the rear mounting bracket of the DLA-50T Blood and Vaccine Refrigerator, (Page 19 Figure 5). It should then be connected to the 24/28VDC plug, located and marked on the Control Panel (Page 13 Figure 4). The AC cable should be plugged into the correct AC main.

For DC operation, use the Power Cable A-2089, supplied with the DLA-50T. Connect the cable between the DC power source and the corresponding receptacle located in the Control Panel (Page 13 Figure 4).

Note: When properly connected, the green power indicator light (Page 13 Fig. 4) should be on. No switching is needed.

The unit is factory set for 110VAC operation. Should the unit be operated in other than 110VAC locations, replace the AC main plug with correct local hospital grade plug.

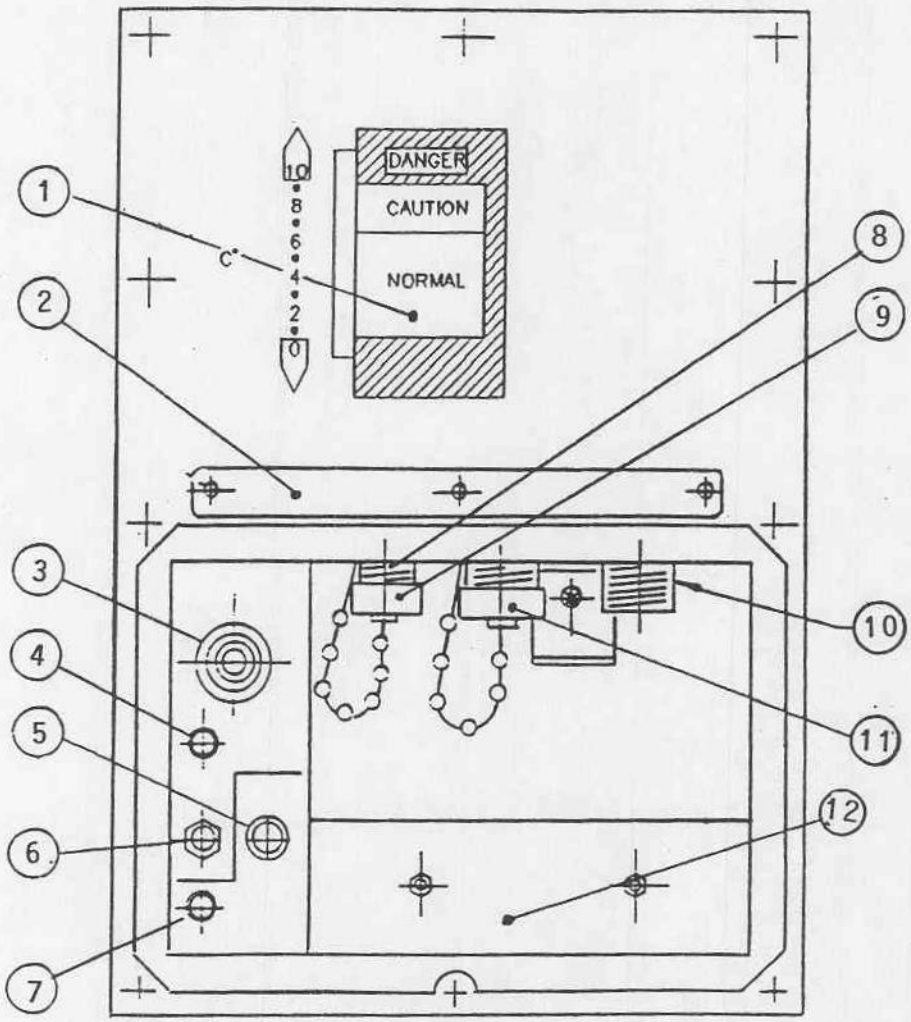

Figure 4
Control Panel
Features and Controls

1. Thermometer
2. Name Plate
3. Audio Alarm
4. Visual Alarm Light
5. Protective Circuit Breaker
6. Alarm Test/Reset Switch
7. Power Indicator Light
8. Remote Thermometer/Recorder
9. Dust Cap
10. 24/28 VDC Receptacle
11. 12 VDC Receptacle
12. Battery Pack

2-4. Initial Adjustments

The DLA-50T is factory set for normal operation. No initial adjustments are necessary.

The connector receptacles, switches and indicators of the unit are all located on the CONTROL PANEL and are marked with their functions (Page 13, Figure 4).

The PS-50B Power Supply is factory set to 110VAC. If used at a 220VAC location, the Power Supply must be set to the local voltages. To set AC voltage, use a flathead screwdriver and move the slide AC select switch to the 230VAC position, as indicated on the top side of the PS-50B Power Supply (Page 7 Figure 3).

2-5. Starting, Operating, and Stopping the Equipment

To start the operation of the DLA-50T, the unit must be connected into an appropriate power source. Once the unit has been properly connected, the green power indicator light (Page 13 Figure 4) will be on. No switching is necessary.

Steps for starting the unit in operation:

1. Source Voltage Determination
   Ascertain available power source voltage: 110VAC, 220VAC, 12VDC, 24-28VDC.

2. Connection to Unit
   Connect in accordance with the source voltage:

Source	Connection	Receptacle
12VDC	Power Cable PN A-2089	J2 - 12VDC
24/28VDC	Power Cable PN A-2089	J1 - 24VDC
110VAC or 220VAC	Power Supply Plug	J1 - 24VDC

3. Installation of Alarm Battery Pack

Install a charged Battery Pack in the Control Panel recess. The indicator of the Compartment Thermometer will light. If the battery voltage is low, the Battery Pack will charge automatically when power is provided to the DLA-50T unit. To ascertain the performance of the Battery Pack, disconnect the DLA-50T after approximately 15 minutes and observe the light on the Thermometer, indicating proper operation of the Battery Pack. For location, see Page 6 Figure 2.

Note: The Alarm will operate with or without the Battery Pack when power is provided to the DLA-50T unit.

4. Alarm/Battery System Test

Push the lever of the Alarm Switch (Page 13 Figure 4), on Control Panel, up to the Test position. The Thermometer indicators will light sequentially and momentarily. The Alarm Red Light (Page 13 Figure 4) will blink and the sound signal will beep.

Push the lever of the Alarm Switch (Page 13 Figure 4) down to the Reset position. The Alarm mode will be off.

5. Connection to Source

For 12VDC or 24/28VDC, the red positive clip of the Power Cable must be connected to the positive (+) contact of the source, and the black negative clip, to the negative (-) contact of the source. For AC operation, the PS-50B is plugged into a main AC outlet.

Note: AC voltage selection

When correctly connected and powered, the green Power indicator (Page 13 Figure 4) on the Front Panel will light, and the DLA-50T will be in operation. The compartment temperature will

be indicated by the color coded, solid state thermometer (Page 13 Figure 4) changing from Red to Yellow to Green in the normal Range.

Note: Remove Battery Pack when the unit is not in operation for short periods of time.

6. Temperature Recording

For hard copy recording, place the activated Temperature Recorder DTR-50-10 inside the storage compartment. To activate, follow instructions on the DTR-50-10.

The receptacle marked TEMP (Page 13 Figure 4) is used to connect a Remote Temperature Recorder or a Remote Thermometer.

Steps for normal operation

Operation is maintenance free. As long as the unit is properly connected to a correct power source, it will maintain a compartment temperature of 35.6° F (2° C) to 42.8° F (6° C).
No adjustments are necessary.

Steps for stopping operation

Stopping the equipment requires unplugging it from its power source. It is advisable to remove the Battery Pack while unit is not in operation since the alarm will sound once the compartment temperature falls outside the acceptable range of 35.6° F (2° C) to 42.8° F (6° C).

Section 3

PS-50B POWER SUPPLY

3-1. General

The PS-50B is a rectifier power supply, designed specifically to provide the power to operate the DLA-50T refrigerator from a 120VAC or 220VAC 50/60Hz in sheltered environments. The input voltage is selectable by the AC selector switch of the PS-50 Power Supply (Page 7 Figure 3).

3-2. Description and Specifications

The PS-50B Power Supply is well protected within a closed metal box. Two cables extend from the unit to connect to the main AC source and to the 24/28VDC receptacle of the DLA-50T unit (Page 19 Figure 5).

Electrical Specifications:

Voltage	Current
120VAC, 50Hz	1.6 Amps Max.
120VAC, 60Hz	1.6 Amps Max.
220VAC, 50Hz	0.8 Amps Max.
220VAC, 60Hz	0.8 Amps Max.

Weight:	8 LBS / 3.7 KGS

Physical Specifications:

Width	8.8" / 22.4 CM
Depth	2.4" / 6 CM
Height	9.9" / 25 CM
Volume	0.12 CU. FT. / 0.034 CU. METER

3-3. Installation

The PS-50B is mounted on the back of the DLA-50T unit (Page 19 Figure 5). When correctly mounted, the Latch will be on top, (Page 7 Figure 3).

Insert the PS-50B slotted spacer plate, located in the bottom of the Power Supply, into the mounting bracket on the back of the DLA-50T unit and fasten the latch located on top of the Power Supply PS-50B assembly (Page 19 Figure 5).

Both cables, the main AC power cable and the 24VDC power cable will come out the bottom of the power supply when mounted correctly.

Connect the DC power cable to the 24/28VDC receptacle of the DLA-50T (Page 19 Figure 5).

Set the AC voltage selection switch to the correct AC voltage main.

Plug in to operate the unit.

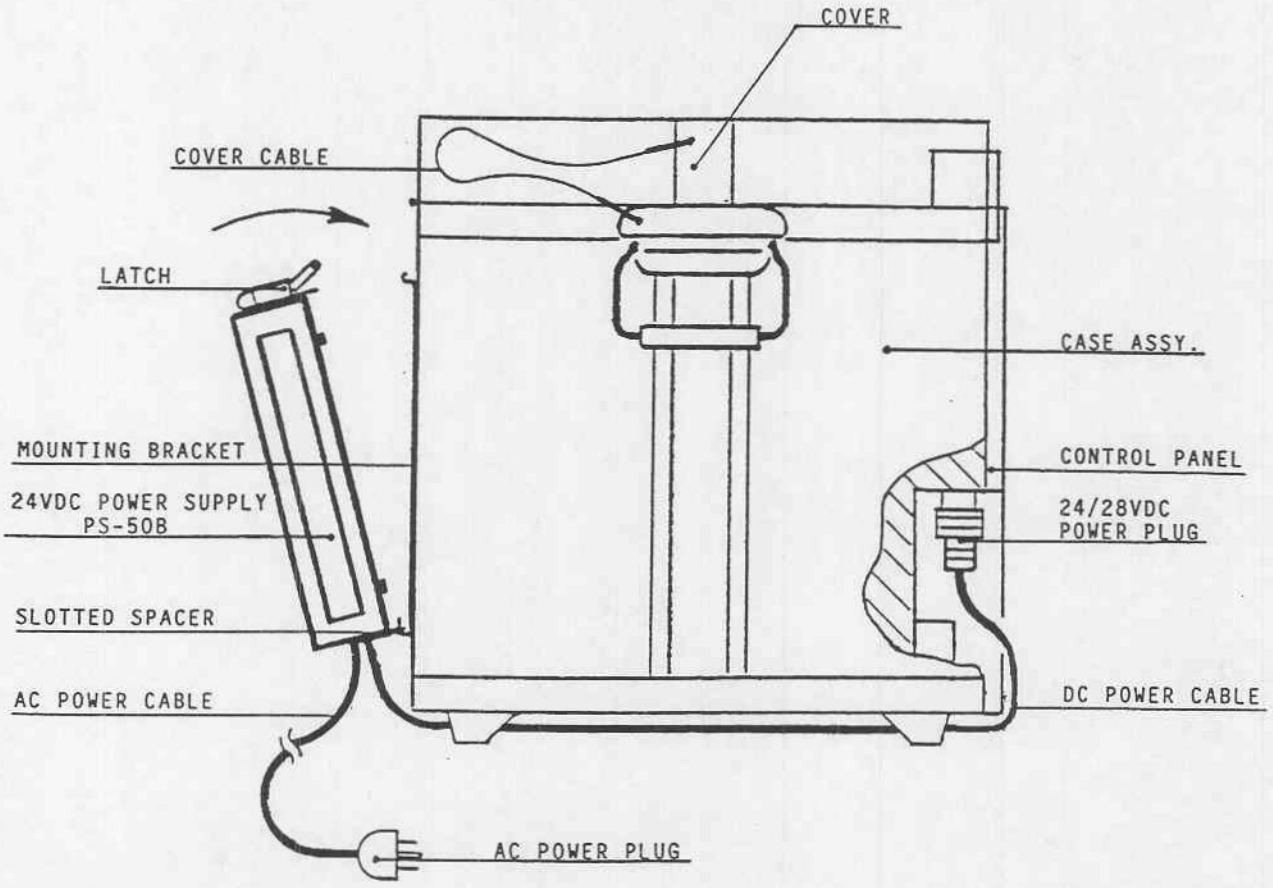

Figure 5
Attaching the PS-50B Power Supply

Section 4

DTR-50-10 Hard Copy Recorder

4-1. General

The DTR-50-10 Temperature Recorder, PN A-2224-2 is a highly reliable, disposable instrument. The drive mechanism is tested and adjusted to close tolerances. The temperature coil is welded into place and cannot get out of adjustment.

The DTR-50-10 will provide a hard copy of the temperature maintained within the load chamber of the DLA-50T. The recorder covers the temperature range of 14° F (-10° C) to 68° F (20° C).

4-2. Activation

To obtain a hard copy, activate the DTR-50-10 as per the instruction on the recorder. Place into the load chamber (together with load).

A hard copy will be initiated from the moment of activation. The recorder will continue to generate the hard copy for 10 days. It will record the temperature of the load chamber for as long as it is left inside the load chamber, up to 10 days.

4-3. Removal

The DTR-50-10 Temperature Recorder may be removed from the chamber at any time. Once removed, it will record the surrounding temperature for as long as the recorder is left outside the load chamber. To secure a hard copy out of the recorder, follow the instructions listed on the recorder.

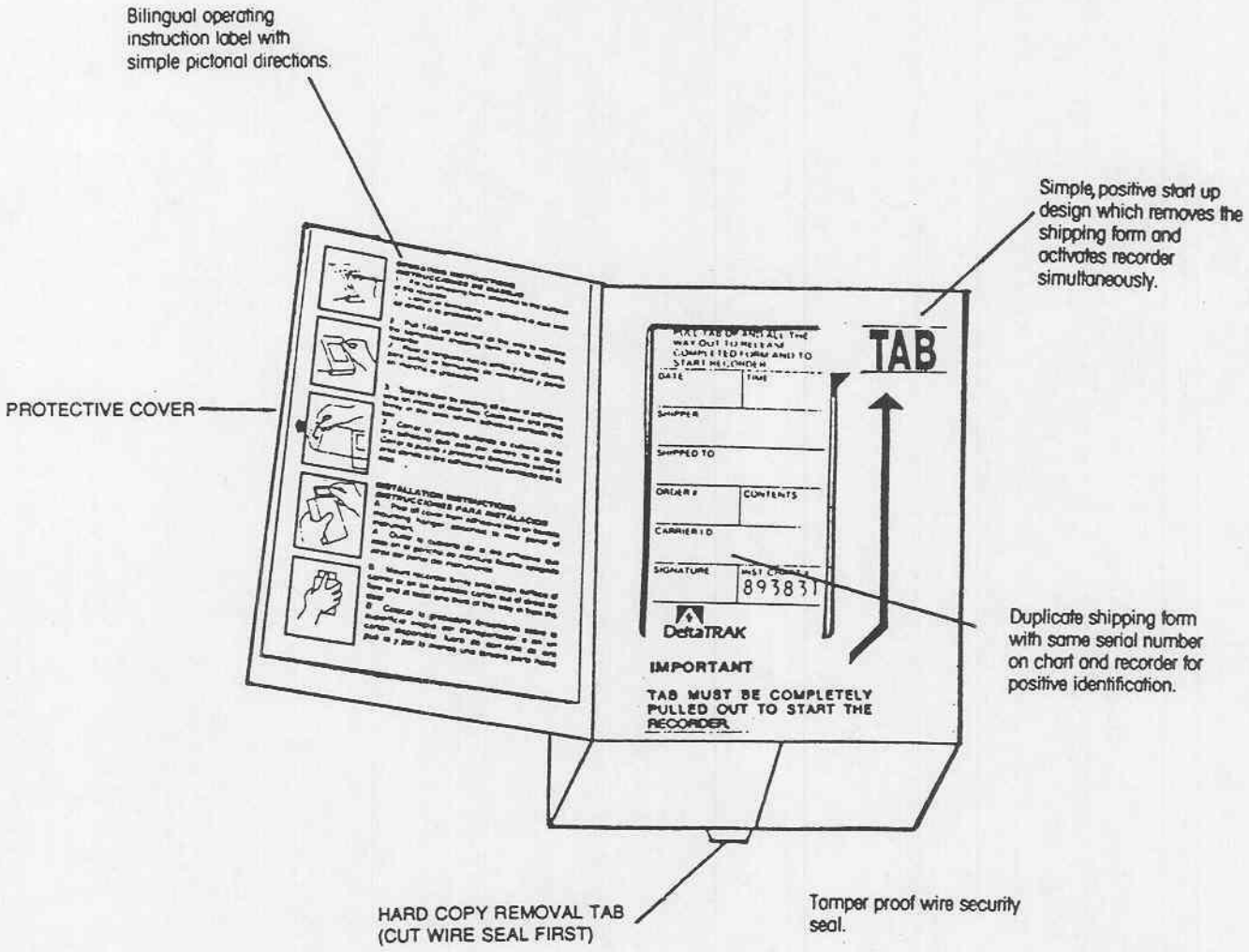
Bilingual operating instruction label with simple pictonal directions.
Simple, positive start up design which removes the shipping form and activates recorder simultaneously.
PROTECTIVE COVER
TAB
DATE
TIME
SHIPPER
SHIPPED TO
ORDER #
CONTENTS
CARRIER ID
SIGNATURE
893831
DeltaTRAK
IMPORTANT
TAB MUST BE COMPLETELY PULLED OUT TO START THE RECORDER.
Duplicate shipping form with same serial number on chart and recorder for positive identification.
HARD COPY REMOVAL TAB (CUT WIRE SEAL FIRST)
Tamper proof wire security seal.

Figure 6
DTR-50-10 Hard Copy Recorder

Section 5

Care and Maintenance

5-1. General

The DLA-50T is a solid state device. As such, there are no moving parts associated with its operation. For proper care and maintenance-free operation, you should keep the unit clean at all times.

The DLA-50T can be wiped clean with a wet cloth, soap and water. For extra soiled areas, stronger safe houshold detergents may be used.

Maintenance: Approximately once a year, blow clean the 4 heat sinks located at the four corners of the DLA-50T, (Page 6 Figure 2).

5-2. Replacement Assemblies

DESCRIPTION	PART #
Power Supply Assy	A-2160-3
Battery Pack Assy	A-2321
Power Cable Assy	A-2089
Recorder Hard Copy	A-2224-2
Wire Basket Assy	A-2428
Operational Manual	DLA-50T-OM1
Maintenance Manual	DLA-50T-MM1

5-3. Options

DESCRIPTION	
Extension Power Cable Assy	A-2316-6 or -8(feet)
Extension Remote Temp Cable Assy	A-2317 - specify length in feet
Remote Temperature Recorder	A-2400

Section 6

Storage

6-1. General

The DLA-50T may be stored in a normally vented storage facility. Storage environmental temperature of -25°F (-32°C) to 120°F (49°C) is acceptable.

Short term: Clean the unit's load compartment with a mild detergent. Store Power Cable, Power Supply, Battery Pack, and Recorder inside the clean load compartment.

Long term: Same as above. In addition, clean outside of unit by blowing an air stream over the unit. Blow dust and dirt from the 4 Heat Sinks located in the 4 corners of the unit. (Page 6 Figure 2). Place in a carton container or cover with a plastic bag. Place in a sheltered area.